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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/826,603	04/16/2004	Axel Brintzinger	2003 P 51167 US	1195
48154	7590	02/17/2006	EXAMINER	
SLATER & MATSIL LLP 17950 PRESTON ROAD SUITE 1000 DALLAS, TX 75252			THAI, LUAN C	
			ART UNIT	PAPER NUMBER
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DATE MAILED: 02/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

Office Action Summary	Application No. 10/826,603	Applicant(s) BRINTZINGER ET AL.	
	Examiner Luan Thai	Art Unit 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 20-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 11-17 is/are rejected.
- 7) ☒ Claim(s) 9, 10, 18 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>4/16/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group II, claims 1-19, filed 12/06/05 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 3, 7, 11, 12, 14, and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Hwang (6,492,198).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 1, 3, 7, 11, 12, 14, and 17, Hwang (see specifically figures 15-17) discloses a method for manufacturing a semiconductor device, the method comprising: providing a semiconductor device (42) that includes a wafer (40, see figure 5) and a conductive area (44) at an upper surface; forming a redistribution layer on the semiconductor device, wherein forming

the redistribution layer comprises: forming a seed layer (50) over the upper surface of the semiconductor device, patterning the seed layer in a redistribution layer pattern; and forming a copper layer (52) over the seed layer (50), the redistribution layer electrically coupling the conductive area to a connection region, coating the redistribution layer with an organic protective layer of BTA (benzotriazole) (102b) by dipping the wafer into a liquid reservoir to protect the redistribution layer from corrosion and oxidation in that it produces a dense covering of the metal surface of the redistribution layer through chemical bonding (Col. 6, lines 1-54).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 6 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang (6,492,198) in view of Yamada (5,683,943).

Regarding claims 6 and 16, Hwang discloses the claimed invention as detailed above except for teaching the organic protective layer (e.g., benzotriazole) being applied by *spraying*.

Note that the organic protective layer such as benzotriazole is widely known being applied on a metal surface by spraying, as disclosed by Yamada (Col. 13, lines 46+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to the apply the spraying process in forming the organic protective layer of benzotriazole on the redistribution layer of Hwang device since such process is widely used in semiconductor art for forming a benzotriazole protective layer on a metal surface, as disclosed by Yamada.

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6. Claims 4-5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang (6,492,198).

Regarding claims 4-5, Hwang discloses the claimed invention as detailed above except for teaching the organic protective layer being Gilicoat® or Preventol®.

The benzotriazole layer (102b) as mentioned by Hwang reference is an organic protective layer. Its function is to protect the redistribution layer from corrosion and oxidation. The claimed of Gilicoat® or Preventol® is widely known as a BTA (benzotriazole) but being made from different Company (e.g., Shikoku Chemical Corp. and Bayer Chemical, respectively, See Applicant's Specification paragraph [0013]).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to substitute the BTA (benzotriazole) layer in Hwang method by Gilicoat® or Preventol®, since such Gilicoat® or Preventol® is widely used in the art to protect the metal surface from corrosion and oxidation, and such application is held to be within the ordinary designing ability expected of a person skilled in the art. Noted that the specification contains no disclosure of either the critical nature of the claimed Gilicoat® and Preventol® materials or any unexpected results arising from them.

Regarding claim 8, Hwang discloses the claimed invention as detailed above except for specifying the range of the temperature of the liquid reservoir to be at about 30°. Hwang does disclose the BTA (benzotriazole) organic protective layer being applied on the surface of the redistribution layer by dipping the wafer into a liquid reservoir as described above.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the BTA (benzotriazole) organic protective layer on the surface of the

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redistribution layer by dipping the wafer into the liquid reservoir at the claimed temperature range because the range or the temperature is an art recognized variable of importance which is subject to routine experimentation and optimization.

7. Claims 2 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang (6,492,198) in view of Takahashi et al. (6,153,448).

Regarding claims 2 and 15, Hwang discloses the claimed invention as detailed above except for teaching a nickel layer formed on the copper layer and a gold layer formed on the nickel layer.

A wiring layer, which comprises three layers of copper, nickel and gold, is commonly applied in the art as disclosed by Takahashi et al. (Col. 5, lines 29+) since it is known in the art that copper is a good conductive material in low cost, gold is good in solder wettability and excellent in corrosion protection, and nickel is excellent in adhesion both to copper and to gold. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that combining Takahashi et al.'s teaching of three-layers wiring with Hwang's invention would have been beneficial because the three-layers wiring is commonly used in the art, as disclosed by Takahashi et al., for good conductive material in low cost of copper, good in solder wettability and excellent in corrosion protection of gold, and excellent in adhesion both to copper and to gold of nickel.

8. The following reference(s) is/are cited as of interest to this application:

U.S. Pat. No. 6,645,606 (Col. 2, lines 22+) to Nakano et al. and US Pub. No. 2005/0189649 (paragraph [0082]) to Maruyama et al. are cited for showing three-layers wiring (copper-nickel-gold) are widely used in the art.

Allowable Subject Matter

9. Claims 9-10 and 18-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

The prior art taken either individually or in combination fails to anticipate or fairly suggest the method steps of: a) *etching the wafer or the semiconductor device prior to the coating with the organic protective layer*, as recited in claims 9 and 18; and b) *the coating of the wafer being repeated or renewed after the wafer has been mounted on a carrier*, as recited in claims 10 and 19; especially when these limitations are considered within the specific combination claimed.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luan Thai whose telephone number is 571-272-1935. The examiner can normally be reached on 6:30 AM - 5:00 PM, Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bradley W. Baumeister can be reached on 571-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

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system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Luan Thai', with a long horizontal flourish extending to the right.

Luan Thai

Primary Examiner

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February 14, 2006